

What is claimed is:

1. A variable engine valve control system with pressure difference comprising a hydraulic supply equipment 1, a hydraulic actuator apparatus 5, a valve 6 and a spring 4 for controlling piston balance; said hydraulic actuator 5 includes a hydraulic cylinder 51, a piston 52 and a piston rod 53; said piston rod 53 is coupled and moved with said valve 6; wherein said piston divides said hydraulic cylinder into an upper chamber and a lower chamber; said hydraulic supply equipment 1 is connected with said upper chamber of said hydraulic cylinder 51 through a general fluid inlet pipe 14, and said lower chamber of the said hydraulic cylinder is connected with said hydraulic supply equipment 1 through a pressure difference proportional relief valve 2.

2. The variable engine valve control system with pressure difference according to Claim 1 wherein said pressure difference proportional relief valve can be a pressure difference feedback control spool valve 2a which includes a valve body 22, spool valve core 21, proportional electromagnet, as well as fluid inlet port (A), fluid outlet port (B) and fluid drain port (T) on said valve body; said valve body 22 is equipped with a horizontally-arranged transverse passage 222 matched with said spool valve core; On said spool valve core 21 is equipped with a column boss 211 which can move with said spool valve core, thereby close or open the control fluid port(c-c) of said column boss 211 connected with a fluid drain port (T); One end of said spool valve core is concentrically contact with the crown bar 25 of said proportional electromagnet; The other end of said spool valve core is supported to a spring 23; on the left side of said valve body 22 there is a left side passage 223 connected with the upper chamber of said hydraulic cylinder and said hydraulic supply equipment 1 through said fluid inlet port(A); on the central position of said valve body there is a longitudinal passage 225 connected to said transverse passage 222 and connected with the lower chamber of said hydraulic cylinder through said fluid outlet port (B); there is a damping passage 224 with damping between said left side passage 223 and said longitudinal passage 225; the upper end of said longitudinal passage 225 is connected to the left end of a right upper side passage 221 of said valve body; The right end of said right upper side passage is connected with a right end passage 227 of said valve body; at the right lower

side of said valve body is situated a right lower side passage 226 with its one end connected with said fluid drain port (T) and its other end connected with said transverse passage.

5 3. The variable engine valve control system with pressure difference according to Claim 2 wherein the damping in said damping passage 224 is a damping aperture 24.

4. The variable engine valve control system with pressure difference according to Claim 2 wherein the damping in said damping passage is formed by a second throttle side (c2)
10 between said column boss and said valve body 22.

5. The variable engine valve control system with pressure difference according to Claim 2 or 3 or 4 wherein a thinner bar 212 projecting out of said valve body 22 with sealing is installed at the both ends of said spool valve core 21; the crown bar 25 of said proportional
15 electromagnet is supported to a slender bar at its relative end.

6. The variable engine valve control system with pressure difference according to Claim 1 or 2 or 3 wherein a hydraulically-controlled check valve 9 in parallel with said pressure difference proportional relief valve 2 can be situated between the upper chamber of said
20 hydraulic cylinder and the lower chamber of said hydraulic cylinder, which causes hydraulic fluid to enter into the lower chamber of said hydraulic cylinder from the upper chamber of said hydraulic cylinder.

7. The variable engine valve control system with pressure difference according to
25 Claim 1 or 2 or 3 or 4 wherein a protrusion is placed on the top of said piston 52, correspondingly, a buffering chamber 56 is coupled with said protrusion on the top cover of said hydraulic cylinder 51, and a fluid passage 59 is situated in the hydraulic cylinder with its one end connected with said buffering chamber 56 and the other end of said fluid passage 59 connected with said hydraulic supply equipment 1 through a first check valve.

30 8. The variable engine valve control system with pressure difference according to Claim

1 or 2 or 3 or 4 wherein a second check valve 10 is yet installed on said general fluid inlet pipe 14 for preventing the fluid of said upper chamber of hydraulic cylinder from flowing toward said hydraulic supply equipment 1.

5 9. The variable engine valve control system with pressure difference according to Claim 1 or 2 or 3 or 4 wherein a pressure accumulator 3 can be mounted on said general fluid inlet pipe 14.

10 10. The variable engine valve control system with pressure difference according to Claim 1 or 2 or 3 or 4 wherein on said piston end surface opposed to said piston rod 53, an auxiliary piston rod 54 can be fitted coaxially with the piston rod projecting out of said hydraulic cylinder 51, said spring 4 can be sleeved round, said auxiliary piston rod 54 outside of said hydraulic cylinder.

15 11. The variable engine valve control system with pressure difference according to Claim 1 or 2 or 3 or 4 wherein said spring 4 can be sleeved round the piston rod 53 outside of said hydraulic cylinder.

20 12. A variable engine valve control system with pressure difference comprising a hydraulic supply equipment 1, a hydraulic actuator apparatus 5, a valve 6 and a spring 4 for controlling piston balance, said hydraulic actuator apparatus 5 comprises a hydraulic cylinder 51, a piston 52 and a piston rod 53; said piston rod 53 is coupled and moved with the valve 6, wherein said piston 52 divides said hydraulic cylinder 51 into a upper chamber and a lower chamber, said upper chamber and said lower chamber are connected with the first fluid port (A1) and the second fluid port (B1) existing pressure difference therein of a pressure difference proportional relief valve respectively through a fluid inlet pipe 16 and a fluid outlet pipe 15; said hydraulic supply equipment 1 is connected with the fluid inlet port C of said pressure difference proportional relief valve 2 through a general fluid inlet pipe 14.

30 13. The variable engine valve control system with pressure difference according to Claim 12 wherein said pressure difference proportional relief valve is a pressure difference

feedback cone valve 2d which includes a cone valve body 22d, a cone valve core 21d, a proportional electromagnet, said fluid inlet port(C), said first fluid port (A1) and said second fluid port (B1) positioned in said cone valve body; the cone valve core head is equipped with a conoid 211d matched with the rear end port of a cone valve body bore 221d and its tail is supported to the crown bar of said proportional electromagnet, and a spring is sleeved round the said cone valve core with its one end supported to the cone valve body 22d, its other end supported to the conoid 211d end surface; said fluid inlet port (C) and said first fluid port A1 are respectively connected with the front and rear ends ports of the cone valve body bore 221d; between the second fluid port (B1) and the first fluid port (A1) is fitted with a passage with a damping aperture 24d; the second fluid port B1 yet is connected with a fluid tank.

14.The variable engine valve control system with pressure difference according to Claim 12 wherein a protrusion is placed on the top of said piston 52, relatively, a buffering chamber 56 is coupled with the protrusion on the top cover of said hydraulic cylinder 51, and an fluid passage 59 is placed in said hydraulic cylinder with its one end connected with said buffering chamber and its other end connected with said hydraulic supply equipment 1 through a first check valve 7.

15. The variable engine valve control system with pressure difference according to Claim 12 wherein a hydraulically –controlled check valve 9 in parallel with said pressure difference proportional relief valve 2 can be situated between the upper chamber of said hydraulic cylinder and the lower chamber of said hydraulic cylinder, which cause hydraulic fluid to enter into the lower chamber of the hydraulic cylinder from the upper chamber of the hydraulic cylinder.

16. The variable engine valve control system with pressure difference according to Claim 12 wherein a pressure accumulator 3 is installed on said general fluid inlet pipe 14.

17. The variable engine valve control system with pressure difference according to Claim 12 or 16 wherein on the piston end surface opposed to the piston rod 53 an auxiliary piston

rod 54 is fitted coaxially with said piston rod projecting out of said hydraulic cylinder 51; said spring 4 is sleeved round said auxiliary piston rod 54 at the outside of said hydraulic cylinder.

- 5 18. The variable engine valve control system with pressure difference according Claim 12 or 16 wherein said spring 4 is sleeved round said piston rod 53 at the outside of said hydraulic cylinder.

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